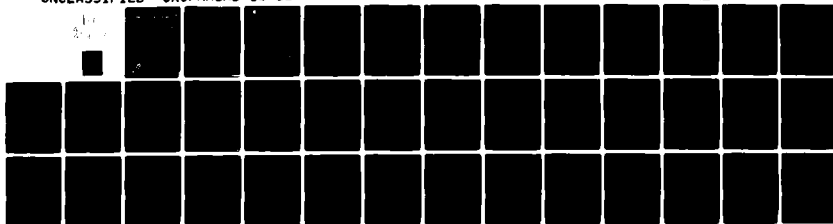


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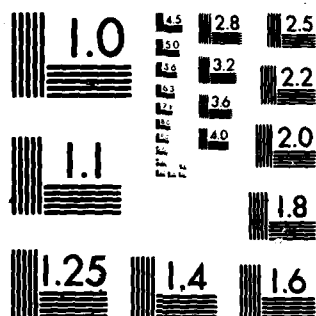


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BY THE COMPTROLLER GENERAL

# Report To The Congress

OF THE UNITED STATES

## Air Force And Navy Plans To Acquire Trainer Aircraft.

LEVEL II

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The Air Force and Navy plan to acquire four different aircraft for training missions. Total costs are expected to be several billion dollars.

With one exception, the Air Force Next Generation Trainer and the Navy Undergraduate Jet Flight Training System acquisition programs are generally being conducted in accordance with Office of Management and Budget Circular A-109. The exception was that the requests for proposals/quotations for each program were too restrictive and precluded consideration of potential alternative solutions.

Congressional interest and direction have been toward common aircraft for both the primary and advanced phases of the Navy and Air Force undergraduate pilot training programs. However, Air Force officials now believe there is little likelihood that the Air Force will use the Navy's advanced trainer aircraft. The Navy's use of the Air Force's primary trainer is also uncertain. GAO believes the Congress should explore the matter further with Defense.

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COMPTROLLER GENERAL OF THE UNITED STATES  
WASHINGTON, D.C. 20548

B-201269

To the President of the Senate and the  
Speaker of the House of Representatives

This report presents our views on the major issues concerning the use of common aircraft for the Air Force and the Navy pilot training, the requirements for trainer aircraft, and the Air Force and Navy efforts to comply with the Office of Management and Budget Circular A-109 in the acquisition of trainer aircraft.

For the past several years, we have reported annually to the Congress on the status of selected major weapon systems. This report is one in a series that is being furnished to congressional committees for their use in reviewing fiscal year 1982 requests for funds.

We are sending copies of this report to the Director, Office of Management and Budget, and the Secretary of Defense.

*James B. Atkinson*  
Comptroller General  
of the United States

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COMPTROLLER GENERAL'S  
REPORT TO THE CONGRESS

AIR FORCE AND NAVY PLANS TO  
ACQUIRE TRAINER AIRCRAFT

D I G E S T

Both the Air Force and Navy are planning to buy trainer aircraft to replace existing aircraft which are nearing the end of their service life. The Air Force is planning to acquire the Next Generation Trainer (NGT) for the first phase of its undergraduate pilot training and the Navy is planning to buy the Undergraduate Jet Flight Training System (VTXTS).

In addition, the Air Force is planning to acquire (1) a tanker-transport-bomber trainer aircraft if a proposed major change in its undergraduate pilot training program is implemented and (2) a companion trainer aircraft which would provide a less expensive alternative for part of B-52 aircrew training. Each aircraft is to be used for a different training mission. (See p. 1.)

Justification for acquisition of the aircraft is based, in part, on the need to reduce fuel and other operating costs and to improve training program effectiveness. Total program cost estimates are not available, but these programs are expected to cost several billion dollars.

AIR FORCE AND NAVY UNDERGRADUATE  
PILOT TRAINING DIFFER

Although many skills taught in Air Force and Navy pilot training are similar, the services conduct separate undergraduate programs and use different aircraft, concepts, and methods. Under the Air Force's generalized approach, all students receive the same training and fly the same aircraft. Under the Navy's specialized approach, student pilots initially receive a common training segment and then receive additional undergraduate pilot training in specific types of aircraft for specific missions. Upon graduation, pilots in both services are assigned to operational units

where they receive additional training in their assigned aircraft. (See pp. 3 to 9.)

COMPLIANCE WITH OFFICE OF MANAGEMENT  
AND BUDGET CIRCULAR A-109

GAO found that, with one exception, NGT and VTXTS acquisition programs were generally being conducted in accordance with the Office of Management and Budget Circular A-109. The exception is that the request for proposals/quotations for each program contained restrictions which effectively precluded consideration of potential alternative solutions to the mission need. Of particular concern, the Air Force's request for proposals effectively excluded the T-34C aircraft which the Navy is currently using for similar training. As a result of congressional direction in December 1980, however, the Air Force is now planning to consider the T-34C as an alternative solution to its NGT requirement. (See pp. 25 to 29.)

Specific actions taken to comply with Circular A-109 include

- expressing needs in mission terms;
- maintaining competition between different design concepts;
- conducting cost, schedule, and performance trade-off studies;
- tailoring acquisition strategy for each system;
- estimating life cycle costs; and
- designating a program manager.

NGT AND VTXTS

Separate Mission Element Need Statements for the two programs were approved in June 1979. Since then, both services have awarded competitive contracts for system design concepts. Five contractors completed conceptual studies of the Air Force requirement for a primary

phase trainer aircraft in October 1980. The Navy awarded six contracts in August 1980 to study possible VTXTS concepts. (See ch. 3.)

Defense Systems Acquisition Review Council evaluations are scheduled in both programs. The Air Force anticipates a Council evaluation of the NGT program before the award of development contract to a single contractor in late 1981. The Navy's plans provide for a Council evaluation before awarding two or three demonstration and validation contracts in the fall of 1981.

Congressional interest and direction have been toward common aircraft for both the primary and advanced phases of the Navy and Air Force undergraduate pilot training programs. Early Air Force and Navy actions in the NGT and VTXTS programs appeared to be directed toward consideration of common aircraft, although it was recognized that actual use of common aircraft would probably not take place for many years. This condition exists because the Navy's T-34C, which corresponds to the NGT, and the Air Force's T-38, which corresponds to the VTXTS aircraft, could remain in service use through the 1990s.

The Air Force now believes, however, that--apart from consideration being given to the T-34C for its primary undergraduate pilot training phase--there is little likelihood of common trainer aircraft being used. Officials said that the requirements to replace current Air Force T-38 and Navy T-34C trainer aircraft may be approved several years after the projected production of Air Force NGT and Navy trainer aircraft is (designated VTX) completed. They also said that differences between Navy and Air Force flight training programs might preclude the development of common aircraft suitable for both services. Furthermore, they said that requirements for a replacement of the Air Force's basic phase trainer--the T-38--have not been identified and may differ significantly from the Navy's VTX aircraft.



A key Navy official stated in February 1981 that, when the T-34C is replaced, the Air Force's primary trainer would be considered. Its selection would not be certain, however, because the decision should be so far in the future that more cost-effective alternatives may be available.

#### TANKER-TRANSPORT-BOMBER TRAINER AIRCRAFT

The Air Force plans to specialize its pilot training program. All student pilots will receive the same training during the initial phase and then be divided into two groups. About 40 to 50 percent of the students would be taught skills to be used in fighter, attack, or reconnaissance aircraft while the other 50 to 60 percent would be taught skills to be used in tanker, transport, or bomber aircraft. The Air Force estimates this would save \$65.5 million and 30.3 million gallons of fuel annually when compared to the present training program. It also believes specialized training will maximize the effectiveness of pilot training and produce a higher quality pilot. Before specialized training can be implemented, a tanker-transport-bomber trainer aircraft must be acquired. (See pp. 18 to 21.)

#### COMPANION TRAINER AIRCRAFT

The companion trainer would be used by the Strategic Air Command to maintain and enhance training of all B-52 aircraft crews. It would be a small, relatively inexpensive, fuel efficient, business-type aircraft with avionics equipment similar to the B-52. The aircraft along with a weapon system trainer (simulator) would augment B-52 flight training and reduce the number of B-52 flying hours. This would reduce operating costs and fuel consumption.

During fiscal year 1981, the Air Force plans to test the viability of training in a companion trainer aircraft. The transferability and the value of companion training are two key factors to be evaluated. Because of differences in equipment on the various B-52 models, the

anticipated training is expected to be less effective for crews of B-52D aircraft than for B-52G and B-52H aircraft. The Air Force plans, however, to exclude B-52D crews (about 25 percent of the B-52 force) from the fiscal year 1981 testing.

Air Force officials recognize that careful consideration of safety factors is necessary since the pilot and copilot would be qualified in both the B-52 and the companion trainer aircraft. Accordingly, the Air Force plans to also evaluate the effects of dual qualification on pilot performance, including possible negative effects, during the first 6 months of the testing. (See pp. 21 to 24.)

#### RECOMMENDATIONS

In view of the congressional interest in common trainer aircraft for comparable phases of the Navy and Air Force undergraduate pilot training programs and the apparent decrease in the likelihood of common trainer aircraft being used, the Congress should explore the matter further with Defense. The objectives would be to determine whether:

- Defense has adequately complied with congressional direction regarding common aircraft.
- The apparent decrease in support, primarily by the Air Force, for common aircraft is warranted.
- The Air Force plans for consideration of the T-34C aircraft meet the congressional intent, as expressed in August 1980 by the Armed Services Committees.

The Secretary of Defense should modify the Companion Trainer Aircraft viability testing to include B-52D crews to obtain actual data on applicability of the training to all crews.

GAO did not request official comments on this report because of the tight reporting deadline. Instead, a draft of this report was discussed with high level officials associated with

management of the program to assure that the report is complete and accurate. Their points of view are included where they differ with GAO's.

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### ABBREVIATIONS

CTA	Companion Trainer Aircraft
DOD	Department of Defense
DSARC	Defense Systems Acquisition Review Council
FAR	fighter-attack-reconnaissance
GAO	General Accounting Office
MENS	Mission Element Need Statement
NGT	Next Generation Trainer
OMB	Office of Management and Budget
SAC	Strategic Air Command
TTB	Tanker-Transport-Bomber
UPT	undergraduate pilot training
VTX	Navy Undergraduate Jet Training Aircraft
VTXTS	Undergraduate Jet Flight Training System

## CHAPTER 1

### INTRODUCTION

Pilot training is a continuing mission of the Navy and Air Force. These services need to maintain the capability to provide in-flight training systems to meet their future pilot requirements. Due to expected increases in pilot attrition, both the Navy and Air Force are projecting significant increases in fixed wing pilot training requirements. In 1979 the Navy and Air Force trained 540 and 1,132 fixed wing pilots, respectively. By 1986, the Navy's fixed wing pilot training workload is forecast to increase over 91 percent to 1,032 pilots and the Air Force's fixed wing pilot production is expected to increase over 108 percent to 2,362 pilots.

### TRAINER AIRCRAFT SYSTEMS BEING CONSIDERED

During the 1980s, the services are planning to either acquire or modernize four trainer aircraft systems for four different training missions. Taken together, these four programs could lead to the acquisition or modernization of about 1,200 aircraft. Total program cost estimates are not yet available, but these programs are expected to cost several billion dollars.

Both services plan to improve their respective undergraduate pilot training (UPT) programs. The Air Force will either modify its T-37B primary jet trainer or replace it with the T-34C or the Next Generation Trainer (NGT) aircraft. The Navy will either modify its T-2C intermediate and TA-4J advanced jet trainers or replace them with the Undergraduate Jet Flight Training System (VTXTS) aircraft--the Navy Undergraduate Jet Training Aircraft (VTX). The services' current UPT aircraft have operational deficiencies, and the T-37B and the TA-4J are nearing the end of their service lives. In addition, the number of T-37B and the TA-4J aircraft currently used for UPT will be insufficient to support predicted Air Force and Navy training requirements.

The Air Force is also pursuing development of two other trainer aircraft systems. A planned change to a specialized UPT instead of current generalized training (see ch. 3) will require a new aircraft to train tanker-transport-bomber (TTB) student pilots. Also, a Companion Trainer Aircraft (CTA) is being considered as a low cost, fuel efficient aircraft for providing proficiency training for B-52 crew members.

## OBJECTIVES, SCOPE, AND METHODOLOGY

We made our review because of congressional interest in coordinating Air Force and Navy programs to buy trainer aircraft. The primary objectives of our review were to determine whether (1) the Navy and Air Force could use the same aircraft for pilot training, (2) the need for the various trainer aircraft is valid, and (3) the NGT and VTXTS programs are being implemented in accordance with the Office of Management and Budget (OMB) Circular A-109 policy.

We interviewed officials at the Office of the Secretary of Defense, Air Force Headquarters, Navy Headquarters, and Naval Air Systems Command, in Washington, D.C.; Office of the Chief, Naval Education and Training, Naval Air Station, Pensacola, Florida; Air Training Command, Randolph Air Force Base, Texas; and Aeronautical Systems Division, Wright-Patterson Air Force Base, Ohio.

Using documents and other information supplied by the above officials, we (1) analyzed the Air Force and Navy pilot training programs, (2) evaluated the Air Force and Navy needs for new trainer aircraft, 1/ (3) compared the capabilities of the Navy T-34C and the Air Force T-37B trainer aircraft with the NGT operational capabilities, (4) evaluated the Air Force and Navy strategy to acquire the various trainer aircraft, (5) determined the extent of compliance with OMB Circular A-109, and (6) reviewed the coordination activities of both services in the acquisition of UPT trainer aircraft. We also discussed the Air Force and Navy implementation of OMB Circular A-109 with OMB officials.

We did not evaluate the effectiveness of the current Navy and Air Force UPT programs. We did not consider it appropriate to contact aircraft manufacturers during this review because of the formal competition that was being conducted and the competition-sensitive nature of the data being developed.

Because of tight reporting deadlines, we did not request official comments on this report. Instead, a draft of this report was discussed with high level officials associated with management of the programs to assure that the report is accurate and complete. Their points of view are included where they differ with ours.

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1/We did not, however, examine the validity of the forecast of increases in pilot training requirements.

## CHAPTER 2

### DIFFERENCES IN PILOT TRAINING PROGRAMS

#### AND EFFORTS TO ACQUIRE COMMON AIRCRAFT

The basic flying skills taught in UPT provide a foundation in the techniques and procedures for flying aircraft and performing missions in future assignments. The Air Force and the Navy use different approaches and aircraft to teach the basic flying skills. All Air Force UPT students receive the same training; fly the same aircraft; and, after graduation, may be assigned to any type of operational aircraft. Navy UPT students receive common primary training and are then divided into three groups for additional specialized training. Navy graduate pilots are assigned to operational aircraft according to the type of training they received. Pilots in both services receive additional training in their operational aircraft.

Although congressional direction in 1979 and early Air Force and Navy actions seemed to be toward the eventual use of common trainer aircraft, it now appears unlikely that the Air Force and Navy will use common trainer aircraft for UPT. During 1979 meetings, officials of both services agreed that a common primary trainer aircraft--the Air Force NGT--and a common advanced jet trainer aircraft--the Navy VTX--could satisfy future pilot training requirements. Because the current Navy T-34C primary trainer and the Air Force T-38 advanced trainer aircraft have service life remaining and the need to replace these aircraft has not yet been established, use of common aircraft for pilot training would not be achievable for at least another decade. More important, Air Force officials said in January 1981 that for the above reasons they no longer have a strong interest in acquiring common trainer aircraft.

A key Navy official stated in February 1981 that when the T-34C is replaced, the Air Force's primary trainer would be considered. Its selection would not be certain, however, because the decision should be so far in the future that more cost-effective alternatives may be available.

### DESCRIPTION OF CURRENT TRAINING PROGRAMS

#### Air Force

Before entering Air Force UPT, nearly all candidates are screened to identify those who are physiologically unsuited or do not possess the innate abilities necessary for flying. This is done either in Officer Training School, Reserve



Officer Training Corps, while attending the Air Force Academy, or at a centralized location. The T-41, or a similar small propeller aircraft is used in this screening.

UPT is a 49-week, 175-flying hour course consisting of preflight (ground) training and two flying phases: primary (using T-37 aircraft and simulators) and basic (using T-38 aircraft and simulators). Preflight training prepares the student for flight training through academic instruction and an introduction to flying procedures. Academic instruction continues throughout the primary and basic phases for a total of about 360 hours in direct support of flight training. In the primary phase, the UPT student receives 32.5 hours of simulator training and 74.4 hours of flight training in the T-37B aircraft. An additional 33.8 hours of simulator training and 101 hours of flight training in the T-38 aircraft are received during the basic phase. The simulators have visual and motion capability, portray the actual aircraft cockpits, and have fully operational controls and full instrumentation.

UPT graduates can be assigned to any type of operational aircraft and receive additional training in the aircraft to which they are assigned. UPT is conducted at Columbus Air Force Base, Mississippi; Vance Air Force Base, Oklahoma; Laughlin Air Force Base, Texas; Williams Air Force Base, Arizona; and Reese Air Force Base, Texas.

### Navy

Pilots for the Navy, Marines, and the Coast Guard are trained in accordance with the Naval Integrated Flight Training System. This system has three training tracks or pipelines: strike, maritime, and rotary (helicopter). Each pipeline has three phases: primary, intermediate, and advanced. The helicopter pipeline also has a basic helicopter phase. Only the primary phase is common to all three pipelines.

After screening, students receive primary flight training. Most of this training is conducted over an 18-week period in a T-34C aircraft at Naval Air Station, Whiting Field, Milton, Florida. During this phase, students learn the fundamental skills and knowledge required to perform basic flight maneuvers and to control an aircraft. Included are 72 hours of flight training in a T-34C aircraft and 141 hours of academic and flight support (ground training) instruction. The Navy is currently purchasing aircraft simulators to be used during this phase.

Students are then assigned to intermediate and advanced training in their assigned pipelines. The length of intermediate and advanced phases is 21 <sup>1</sup>/<sub>2</sub> weeks for helicopter training, 22 weeks for maritime training, and 40 weeks for strike (jet) training. The intermediate and advanced phases of the strike pipeline, which VTXTS is to replace, are discussed below.

The intermediate and advanced phases of strike training provide students with the skills and knowledge needed to control a tactical jet aircraft and to develop flying abilities required to transition to operational aircraft. Training for both phases is conducted at naval air stations located at Beeville, Texas; Kingsville, Texas; Meridan, Mississippi; and Pensacola, Florida. The following is a breakdown of the training provided.

	<u>Strike training hours</u>	
	<u>Intermediate</u>	<u>Advanced</u>
	<u>phase</u>	<u>phase</u>
Flight training	100.0	91.3
Simulator training	43.5	71.9
Flight support	56.1	42.0
Academic instruction	<u>57.1</u>	<u>41.2</u>
Total	<u>256.7</u>	<u>246.4</u>

The T-2C aircraft is used for flight training in the intermediate phase and the TA-4J aircraft is used during the advanced phase.

Navy UPT graduates are generally assigned to operational aircraft similar to that in which they had received advanced training. Like Air Force pilots, they receive additional instruction in readiness training programs.

#### DIFFERENCES BETWEEN AIR FORCE AND NAVY PROGRAMS

Although many of the skills taught are similar, the services use different training methods and concepts. Under the Air Force's generalized approach, all students receive the same training; fly the same aircraft; and, upon graduation, may be assigned to any type of fixed wing aircraft for additional training. Under the Navy's specialized approach,

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1/Includes a 5-week basic helicopter training phase.

students go through a common primary training phase and then receive additional undergraduate training in specific types of aircraft depending on their assigned pipelines. Upon graduation, the Navy pilot is assigned to readiness training units for additional training in operational aircraft. If the Air Force's planned specialized UPT is implemented, Air Force pilot training would be similar to the Navy. See page 19 for a discussion of specialized UPT.

The following are some of the other differences in the way the Air Force and Navy conduct their pilot training programs.

- The Navy uses several auxiliary airfields during their primary phase of flight training while the Air Force generally has one auxiliary airfield for each UPT base.
- The Navy provides about 47 hours of training in air combat maneuvers and weapons delivery during the intermediate and advanced phases of strike training. Additional combat maneuver and weapon delivery training is taught after graduation. In the Air Force, combat maneuvers and weapons delivery are taught after graduation by the operating command.
- Graduates of the Navy strike training pipeline are qualified to takeoff and land on a carrier.
- An Air Force student pilot receives all training at one base. Navy student pilots may move from one base to another between the primary and intermediate phases of training.
- Navy helicopter pilots receive about 98 hours of fixed wing pilot training before being assigned to helicopter pilot training. Air Force helicopter pilots receive no fixed wing pilot training.
- Current Air Force and Navy trainer aircraft have different handling characteristics and performance levels.

#### AIR FORCE AND NAVY ACTIONS TO ACQUIRE COMMON TRAINER AIRCRAFT

Although congressional direction in 1979 and early Air Force and Navy actions seemed to be toward the eventual use of common trainer aircraft, it now appears unlikely that the Air Force and the Navy will use common trainer

aircraft for UPT. One possible exception is the Air Force's consideration of the T-34C for the primary UPT phase. (See p. 29.)

In a September 20, 1979, report, the House Committee on Appropriations stated that future funding support would be provided for developing and procuring one new basic trainer and one new advanced trainer and that the two new aircraft systems should provide for all the basic and advanced trainer requirements of both services in the future. The report also stated that any service unique requirements must be addressed and resolved from the outset.

Air Force and Navy officials began formally discussing the issue of hardware commonality in early 1979. During a meeting in February 1979, Navy and Air Force officials agreed that (1) based on the size of each service's UPT program and the unique carrier requirements of the Navy, consolidation of pilot training would not be practical and (2) the Air Force requirements to replace or extend the service life of the T-37 primary trainer and the Navy requirement to replace or extend the service life of the T-2C/TA-4J advanced trainers were for different UPT phases and could not be met by a single aircraft design. At that time Air Force officials expressed a strong interest in considering the VTX as a future replacement for the T-38, and Navy officials said they would follow the Air Force's efforts to satisfy its primary trainer needs and include the Air Force's eventual primary trainer in its evaluation of alternatives when the need to replace its current primary trainer arise.

During subsequent meetings, Air Force and Navy officials

- reviewed each other's requirements, schedules, programming, and budgeting of trainer aircraft acquisition;
- remained firm in their conviction that the Navy VTXTS and the Air Force NGT might provide for both service's training requirements in the future;
- reiterated support for individual development of aircraft tailored to current service requirements;
- established formal program liaison to actively exchange pertinent data; and
- agreed that any joint program designation would more appropriately follow the concept exploration or validation/demonstration phase.

Additionally, Air Force and Navy program managers reviewed the other service's request for proposal/quotation for the NGT and VTXTS concept formulation studies and concurred with the requirements and approach. An Air Force Air Training Command official participated as an observer in the source selection of contractors for the VTXTS concept exploration phase, and the Air Force plans to request a Navy representative to participate in source selection for NGT full-scale engineering development contractors.

An April 1980 Assistant Secretary of Defense memorandum outlining the Department of Defense (DOD) position on recommendations in congressional committee reports stated that (1) DOD agreed NGT and VTXTS should be used by both services as eventual replacements for existing basic and advanced jet trainers and (2) the Air Force and Navy were working together to define their needs so that both NGT and VTXTS would ultimately be used by both services. The memorandum stated that DOD would ensure that Air Force and Navy unique requirements were considered from the outset.

Actual use of common aircraft by the services for UPT, however, may not be achievable for at least another decade. The initial operational capability of the Air Force NGT and Navy VTXTS is scheduled for 1987 and 1989, respectively. If achieved, these dates would be the earliest that use of common hardware could begin. However, the T-34C and the T-38 aircraft, which would be replaced by NGT and VTX, respectively, could be used until the late 1990s. The Navy began using the T-34C as a primary trainer in 1977. Since a 15- to 20-year service life is normal, a Navy requirement to replace the T-34C may not come about until the late 1990s. Navy officials said that there is no forecast of when such a requirement may be made. Likewise the Air Force T-38 is expected to be serviceable under its present use until the 1990s, although the number of aircraft may become insufficient to meet UPT requirements. If specialized UPT is implemented, the T-38 could be used until 2000 or later.

The actions of both services prior to January 1981 seemed to be consistent with the congressional direction. However, Air Force officials advised us in January 1981 that they no longer have a strong interest in acquiring common trainer aircraft, and therefore, the use of common trainer aircraft may not become a reality. They said that the requirements to replace the Air Force T-38 and Navy T-34C trainer aircraft may be approved several years after the projected production of NGT and VTX trainer aircraft is completed. They also said differences between Navy and Air Force flight training programs might preclude the development of common aircraft

suitable for both services. Furthermore, they said requirements for a replacement of the T-38 have not been established and may differ significantly from the Navy's VTX.

A key Navy official stated in February 1981 that when the T-34C is replaced, the Air Force's primary trainer would be considered. Its selection would not be certain, however, because the decision should be so far in the future that more cost-effective alternatives may be available.

#### RECOMMENDATION

In view of the congressional interest in common trainer aircraft for comparable phases of the Navy and Air Force UPT programs and the apparent decrease in the likelihood of common trainer aircraft being used, we recommend that the Congress explore this matter further with DOD. The objectives would be to determine whether (1) DOD has adequately complied with congressional direction regarding common aircraft, (2) the apparent decrease in support for common aircraft is warranted, and (3) the Air Force's plans for consideration of the T-34C aircraft meet the congressional intent.

### CHAPTER 3

#### REQUIREMENTS FOR NEW TRAINER

#### AIRCRAFT BASED ON COST SAVINGS

#### AND INCREASED PROGRAM EFFECTIVENESS

Air Force and Navy plan to acquire four new trainer aircraft are based on the need to reduce fuel usage and operating costs, the need to replace aircraft approaching the end of their service lives, inadequate quantities of current aircraft, and the desire to improve training program effectiveness. The four aircraft/training systems are discussed in the following sections.

Each of the trainer aircraft is to be used for a different training mission. Three of these aircraft--NGT, VTX, and Tanker-Transport-Bomber (TTB)--are for different portions of undergraduate pilot training while the fourth--CTA--is for maintaining the operating proficiency of B-52 aircraft crews. Regarding CTA, the Air Force has recognized that the planned training, if implemented, would not be as effective for B-52D crew members (about 25 percent of the B-52 force) as for B-52G and B-52H crews because of differences in the aircraft equipment.

#### NGT COULD REDUCE TRAINING COSTS

The requirements for NGT are based on the need to increase the effectiveness of the UPT program while decreasing costs. An NGT with improved engines, avionics, and other equipment could reduce fuel and maintenance costs, reduce sortie cancellations, and alleviate airspace congestion problems. The NGT aircraft is being developed for the primary phase of the Air Force's UPT. Alternatives to satisfy the primary phase requirement range from a new NGT aircraft to a relatively simple life extension of the existing T-37B primary trainer aircraft which will not eliminate current operating deficiencies or provide sufficient aircraft to meet pilot training requirements. As presently envisioned, a new NGT aircraft would be a pressurized, two-seat, side-by-side, aircraft with two low fuel consuming engines, updated avionics, and modern cockpit instrument displays. Final aircraft configuration, however, will not be known until after submission and evaluation of proposals for follow-on full-scale development. During concept exploration studies completed in October 1980, three contractors considered a new aircraft design, one contractor considered a modification of prototype trainer aircraft, and one contractor considered modernization of the

T-37B aircraft. The Air Force is also studying the feasibility of a relatively simple life extension of the T-37B.

#### Background

Between 1971 and 1977, several studies of the Air Force's UPT program were made. Based on these studies, the Air Training Command issued a general operational requirement in March 1978 for a replacement of the T-37B primary trainer aircraft and for a specialized UPT system. The requirements document identified T-37B operational deficiencies and stated the T-37B aircraft was approaching the end of its service life and would become numerically insufficient to meet Air Force training needs in the late 1980s.

Based on the requirements document, Headquarters, United States Air Force prepared a Mission Element Need Statement (MENS) for a replacement of the T-37B aircraft. The Deputy Secretary of Defense approved the MENS on June 26, 1979. It states that replacement, modernization, or modification of the T-37B primary trainer will be needed to provide an effective UPT program beyond the late 1980s. It identified the following T-37B deficiencies.

- The aircraft is approaching the end of its certified service life.
- Fuel consumption is excessive when compared to modern standards.
- Excessive maintenance requirements increase operating costs.
- Engine noise levels are twice that permissible under Federal aviation regulations.
- Limited range and endurance restricts mission flexibility.
- Limited performance restricts training to lower altitudes where airspace is becoming more congested, more hazardous, and more difficult to obtain for pilot training roles.
- Limited weather capability restricts full training potential.
- Instrument displays are not consistent with Air Force mission aircraft.



The MENS also stated that procurement of a new primary training aircraft with state-of-the-art technology in propulsion systems, avionics, and airframe design could result in significant life cycle cost savings by reducing fuel consumption by about 50 percent and maintenance requirements by about 30 percent.

#### T-37B deficiencies and possible improvements

Some of the T-37B deficiencies and possible improvements in a new or modernized aircraft are discussed below.

##### T-37B service life

As of March 31, 1980, 372 T-37B aircraft had been flown more than 10,000 hours and are, therefore, approaching the aircraft's current certified service life of 15,000 hours. A T-37B aircraft is normally flown about 550 hours each year. With the anticipated increase in student load discussed in chapter 1, the number of required T-37B aircraft will exceed the number of available T-37B aircraft in fiscal year 1987. The number of available aircraft will steadily decrease in subsequent years unless the aircraft service life is extended.

The Air Force is analyzing T-37B airframe durability and damage tolerar. to define inspection and modification requirements which would extend its service life to 25,000 hours. Extension of service life would permit continued usage but would not eliminate other operating deficiencies--noisy engines, outdated avionics, excessive fuel consumption, and limited range and weather capability--nor provide sufficient aircraft to accommodate anticipated student load. The analysis is expected to be completed in May 1981.

During earlier testing, the Air Force Logistics Command identified six modifications which would be required to extend the T-37B service life to 25,000 hours. The estimated costs of these modifications was \$70,000 an aircraft in 1979 dollars.

##### Fuel consumption

A new or modernized aircraft would be expected to use less fuel than the T-37B aircraft. The T-37B aircraft used 185 gallons of fuel each flying hour. An aircraft manufacturer stated in a 1978 unsolicited proposal that fuel usage in a new or modified aircraft would be 50 percent of the T-37B fuel consumption. Air Force officials said the NGT concept exploration studies completed in October 1980 showed

that a new or modified trainer aircraft would use 80 to 90 gallons of fuel or less each flying hour.

#### Maintenance requirements

A new or modernized aircraft would also be expected to require less maintenance than the T-37B. Fiscal year 1980 maintenance costs for the T-37B were \$147 a flying hour. Factors that contribute to the maintenance costs include (1) the need to service the gaseous oxygen system after each flight, (2) the need to jack the aircraft for engine removal, (3) deficiencies in electrical components, and (4) the presence of two refueling points.

The Air Training Command anticipates that a modern easier-to-maintain aircraft could substantially reduce maintenance requirements. In a 1978 unsolicited proposal, an aircraft manufacturer estimated maintenance hours for a new or modified aircraft would be about 65 percent of the T-37B aircraft maintenance hours. Maintenance costs was one of the items considered during the concept exploration studies completed in October 1980.

#### Range and weather limitations

An improvement in range and adverse weather flying capability would reduce the number of canceled training flights. About 20 percent of the T-37B flights are canceled due to weather. The majority of the cancellations are due to a lack of a suitable alternate airfield within the T-37B range. The number of available alternate airfields would increase significantly if the trainer aircraft range was increased to the NGT requirement.

Some flights have been canceled because the T-37B does not have the capability to fly through or above adverse weather conditions such as icing conditions, turbulence, and thunderstorms. Flight cancellations could be reduced if the trainer aircraft met the requirements to fly through or above adverse weather, complete a 1.5 hour training mission, and still cruise to an alternate airfield 300 nautical miles away with sufficient fuel reserves.

#### Airspace congestion

Because the airspace at lower altitudes is becoming increasingly crowded, the Air Force has established a requirement that the UPT primary phase aircraft must be able to conduct training at altitudes up to 35,000 feet. The T-37B is limited to operations at 25,000 feet or below because the

cabin is not pressurized. The influx of 17,000 new civil aircraft each year coupled with the location of four UPT bases near some of the Nation's busiest airports has increased the competition for available airspace between 10,000 and 25,000 feet within the training areas. As this airspace becomes more crowded, the Air Force has more difficulty operating safely at the lower altitudes. Therefore, the Air Force established a requirement to train at altitudes up to 35,000 feet so that training can be conducted in the less crowded airspace.

#### NGT acquisition efforts and plans

In February 1980 the Air Force issued a request for proposals soliciting proposals for NGT concept exploration studies. Five of nine responding corporations were awarded parallel short term contracts in June 1980 to identify solutions to the deficiencies stated in the MENS, to perform cost and performance trade-off studies, and to prepare life cycle cost estimates of the proposed concepts. The contractors completed their studies in October 1980. In December 1980 the Air Force completed an evaluation of the study results. We did not assess the Air Force's evaluation.

Air Force officials plan to request a waiver from the normal acquisition practices to omit the demonstration/validation phase because they believe NGT is a low risk program involving off-the-shelf, state-of-the-art technology. If the demonstration/validation phase is waived, the Air Force will issue a request for proposal for full-scale engineering development. After full-scale development proposals are evaluated, the Defense Systems Acquisition Review Council (DSARC) will review the program and the Secretary of Defense will make a decision on whether to proceed with full-scale development. This decision is tentatively scheduled for late 1981.

Another DSARC review and a Secretary of Defense decision is scheduled before production begins. The decision to begin production is scheduled in two parts in an effort to ensure an adequate flow of long lead materials to meet production requirements. The first decision to initiate acquisition of long lead, time-critical materials is tentatively scheduled for the first quarter of fiscal year 1983, near the midpoint of the full-scale development phase. The decision to authorize full production is tentatively scheduled for the first quarter of fiscal year 1986. The planned initial operational capability is 1987.

As of January 1981, the estimated NGT program costs were \$230.3 million for research and development and

\$1,190.6 million for production through fiscal year 1987. Additional production costs for fiscal year 1988 and beyond have not been established.

#### VTXTS IS TO MEET FUTURE TRAINING REQUIREMENTS

VTXTS is to provide effective flight training to meet fleet requirements in the 1990s and beyond and is to reduce training costs. It is to replace the current intermediate and advanced phases of the Navy's strike (jet) training pipeline and is to consist of four major integrated elements: academics, simulators, a training management system, and an aircraft designated the VTX. Alternatives being considered range from a new aircraft to a service life extension of existing TA-4J aircraft or new production of the current T-2C training aircraft. VTX is to be a carrier operable, tandem-seat aircraft with fuel efficient jet power, updated avionics, and advanced cockpit and windscreen displays. Like the Air Force NGT, the final VTX aircraft configuration will not be known until completion of conceptual exploration studies and follow-on validation/demonstration. During concept exploration, modifications of three existing aircraft and three new aircraft designs were being studied.

#### Background

Interest leading to VTXTS began in the early 1970s when the Navy determined that the current T-2C intermediate and TA-4J advanced trainer aircraft would not be adequate for conducting UPT past the late 1980s and beyond. Initial requirements studies begun in 1973 and completed in 1977 established the feasibility of the VTXTS concept. Contractor studies completed in mid-1979 concluded that VTXTS could result in increased training and cost effectiveness compared with the present system. These studies considered six possible alternatives: extend the service life of the T-2C and TA-4J, modify retiring fleet aircraft, reopen T-2C production lines, acquire existing modern aircraft, acquire new design training aircraft, and select a combination of some of these alternatives.

In June 1979 the Deputy Secretary of Defense approved the MENS for the VTXTS program. The MENS established a need to extend or provide an optimized replacement for the present training system to meet future pilot production requirements. It identified the following deficiencies in the existing capability.

- The existing flight training system is becoming increasingly expensive to operate and maintain.
- The TA-4J advanced trainer aircraft currently in use are projected to begin reaching service life completion in fiscal year 1985.
- The ability of the present system to provide comprehensive effective training in response to fleet requirements in the 1990s and beyond is doubtful.

#### Current trainer deficiencies

Each of the deficiencies identified in the existing training system in the VTXTS MENS is discussed below.

#### Training system costs

Increased fuel costs and maintenance requirements due to aircraft age has raised the cost to train students. The fiscal year 1980 cost to operate and maintain the T-2C and the TA-4J aircraft was \$522 and \$666 a flying hour, respectively. Lower operation and maintenance costs can be expected in a new system as a result of lower fuel consumption, improved reliability and maintainability, reduced maintenance personnel and training requirements, logistics commonality, and use of the latest available technology.

#### Service life

The projected number of available advanced trainer aircraft does not meet Navy requirements in the late 1980s. The Navy has contracted with the TA-4J aircraft manufacturer to study possible TA-4J service life extension from 7,500 hours to 12,000 hours. The study is scheduled to be completed in September 1981, but according to Navy officials, preliminary information indicates that the service life could be extended. The Navy decision will be made after the contractor completes the study. The service life of the T-2C aircraft does not affect the training system until the early 1990s. In 1979 the Navy extended the T-2C service life from 7,500 hours to 12,000 hours based on an analysis of its fatigue life.

Even if the service life of the TA-4J aircraft is extended, the number of available TA-4J aircraft may not be sufficient to meet Navy requirements. The following shows the Navy Training Command's projected TA-4J requirements and availability.

<u>End of fiscal year</u>	<u>Number of Navy Training Command aircraft</u>	
	<u>Needed</u>	<u>Available (note a)</u>
1985	186	163
1986	189	158
1987	189	153
1988	189	148
1989	189	143
1990	189	138

a/Other TA-4J aircraft are in the Navy's inventory but are not assigned to the Navy Training Command.

The decrease in the number of available aircraft is due to attrition. The above shows that by the end of 1990, the Navy has a projected need for 51 more aircraft than available.

Ability of current trainers to  
provide effective training

The MENS also stated that the sophistication and capabilities of fleet weapon systems in the mid-1980s and beyond dictate the need for a jet flight training system capable of providing pilots who can operate the fleet weapon systems. Factors which make new training requirements necessary include (1) the introduction of aircraft, such as the S-3, F-14, and F/A-18, and their modern instrumentation and (2) the possibility of pursuing night carrier qualification within the UPT syllabus.

VTXTS acquisition efforts and plans

In December 1979 the Navy released a request for quotations soliciting industry proposals to conduct VTXTS concept exploration studies. Six contracts were awarded in August 1980 for concept exploration studies to identify solutions to the deficiencies stated in the MENS. The contracts were evenly divided between studies of existing aircraft or modifications of them and new designs. The contracts required cost, performance, and schedule trade-off studies and life cycle cost estimates. Concurrently, the Navy also contracted for a study of a possible TA-4J service life extension. The concept exploration studies are scheduled to be completed in March 1981 and the TA-4J service life extension study is scheduled to be completed in September 1981. Navy evaluation of the study results is scheduled to be completed in the fall

of 1981 before a DSARC review and a Secretary of Defense decision authorizing a demonstration/validation phase.

Two or three of the competing concepts will be selected for the nearly 2-year demonstration/validation phase. At the completion of the demonstration/validation phase, one contractor will be selected to complete full-scale development. The Secretary of Defense decision authorizing full-scale development is tentatively scheduled for 1983. A production decision is planned for 1988 with an anticipated initial operational capability in 1989. Estimated program costs will depend on the training system configuration selected.

#### TTB TRAINER COULD PROVIDE MORE EFFICIENT TRAINING

The Air Force plans to use a TTB trainer aircraft system if its proposed specialized UPT system is approved. It is unlike the current generalized system where all fixed wing student pilots receive common training before assignment to operational aircraft ranging from fighters to heavy bombers. Pilots trained under specialized UPT would complete a common primary training segment, but further undergraduate training would be oriented toward each student's anticipated operational assignment. Student pilots would be segregated into one of two specialized tracks: either the fighter-attack-reconnaissance (FAR) training track using the T-38A or the TTB training track which would use a TTB trainer aircraft.

TTB, as presently planned, would be an off-the-shelf business jet with a minimum of two fuel efficient turbofan engines; seating for three crew members; and equipment and systems representative of a large aircraft, such as autopilot, weather radar, and modern navigation systems. When we completed our fieldwork in December 1980, the Secretary of Defense had not approved the specialized UPT operational concept. Therefore, acquisition had not begun, and a final aircraft configuration had yet to be established.

#### Background

The need for a TTB aircraft is founded on studies conducted from 1968 to 1978 which concluded that a change to specialized UPT may be more effective than the current generalized approach. The studies also concluded that specialized UPT would produce a better trained, more highly motivated pilot and offer the opportunity to explore advances in technology to reduce costs and fuel consumption.

In March 1978 the Air Force Air Training Command issued a general operating requirement for specialized UPT. The requirements document identified a need for specialized, instead of generalized, UPT and called for acquisition of two aircraft: a TTB trainer and a replacement or modification of the T-37B trainer, now termed NGT. Officials at Air Force Headquarters decided to separate NGT and specialized UPT programs. As previously discussed, the NGT program received formal approval. The specialized UPT policy, however, was intentionally delayed until the NGT program was firmly established.

In July 1980 the Air Force Chief of Staff endorsed the specialized UPT dual track concept. A draft MENS requiring acquisition of a TTB aircraft is under development, and approval of the MENS is expected by May 1981. Because the MENS has not been approved, an acquisition program has not been established and total program costs have not been estimated. The Air Force plans to request fiscal year 1983 funds to begin acquisition of the TTB aircraft. A 1986 initial operational capability is being considered.

#### Need for specialized UPT and TTB

The Air Force requirement for a TTB aircraft under the specialized UPT concept was based on the need to correct training deficiencies in the current generalized UPT program while training pilots in a more cost efficient manner. The Air Force estimates specialized training would annually save over \$65 million and over 30 million gallons of fuel compared to the present generalized UPT program.

#### Deficiencies of generalized training

Generalized pilot training was adopted in 1960 when the Air Force decided to develop an all jet force. This generalized approach, however, is a compromise solution that does not maximize training for pilot graduates going to either a TTB- or FAR-type end assignment. Generalized training has also been necessarily fighter oriented because of the type of UPT aircraft (T-37/T-38) currently available. In contrast, 50 to 60 percent of UPT graduates go on to fly TTB-type aircraft. Consequently, student pilots destined to fly TTB-type aircraft currently receive training for tasks they may never perform and receive limited training oriented toward their pending aircraft assignment.

#### Debate over specialized training

The Air Force desire to return to the specialized training philosophy (which it followed prior to 1960) was prompted



by the results of UPT studies conducted from 1968 to 1978. Several studies showed that improved training would result from a specialized system tailored to the specific needs of pilots bound for either TTB or FAR assignments.

Within the Air Force, however, there was a question whether pilots produced under a specialized system would provide the same degree of force flexibility as was perceived to exist under the current generalized UPT program. A 1977 Air Training Command study and an Air Staff review concluded that the ability of the Air Force to deal with changing force structure would not be impaired by converting from generalized to specialized UPT. The study stated that while all current UPT students receive the same generalized training under the same syllabus, it was not true that they were universally assignable. It found that just 63 percent of pilots graduating from generalized UPT could be considered universally assignable.

Furthermore, during the peak of Southeast Asia activities, only 250 to 300 pilots per year were required to cross-train between FAR and TTB weapon systems to meet changing force requirements. This amount of cross-training during a worst case scenario represented less than 10 percent of pilots trained during that period. They further found that those who were cross-trained received the same conversion training, although some of the pilots were graduates of specialized UPT and some were graduates of generalized UPT. Therefore, it was concluded that specialized UPT would not limit force structure flexibility and that savings accrued through specialized UPT would more than offset the cost to cross-train pilots when the need arises.

#### Need to reduce training costs

In addition to improved quality of pilot graduates, the Air Force anticipates a significant reduction in training costs if TTB is used. Under specialized UPT, only future FAR pilots would be trained in the relatively expensive to operate T-38. Since about one-half or less of UPT graduates receive FAR assignments, T-38 flying hours would be reduced a corresponding 50 to 60 percent and be transferred to the TTB trainer. According to the Air Force, this transfer of flying hours to the TTB aircraft could produce significant cost, fuel, and manpower savings through advances in airframe and engine technology.

An April 1980 cost analysis shows that specialized training evenly divided between FAR and TTB would annually save \$65.5 million and 30.3 million gallons of fuel. Assuming

an acquisition cost of \$2 million each for 180 TTB aircraft, the cost analysis estimated that the savings would pay back the \$360 million investment in 5-1/2 years. In addition to an annual savings, the 50- to 60-percent reduction in T-38 flying hours would prolong the aircraft's operational service life to about the year 2000. However, the T-38's high fuel consumption coupled with escalating fuel costs could possibly lead to an earlier replacement of the T-38 aircraft.

#### CTA IS TO HELP MAINTAIN B-52 COMBAT READINESS

The CTA system concept is to provide lower cost training for B-52 crew members, except the aircraft gunner, in lieu of training in the higher fuel consuming B-52 bomber. In this role, CTA would augment the B-52 by providing integrated aircrew training on typical low level training missions and reduce flying requirements for the eight engine B-52.

CTA is envisioned as a small, relatively inexpensive, off-the-shelf, business jet-type aircraft that is fuel efficient, able to carry five crew members, and is to be internally configured with systems similar to the B-52. Final configuration will not be known until the CTA concept is validated during the full-scale development effort.

#### Background

Due to high B-52 operating costs, the Strategic Air Command (SAC) is planning to use alternate training methods to maintain B-52 crew combat readiness. SAC's credibility as a deterrent has been maintained through intensive combat crew training in the B-52 aircraft. Escalating fuel costs and fiscal constraints threaten to limit the amount of fuel available for flight training. As the price of fuel increases and the ability to retain B-52 crew members decreases, it becomes increasingly difficult to maintain the desired level of training. Since 1971, the average flight experience of the B-52 aircraft crews has decreased from over 2,000 hours to about 750 hours.

Because the B-52 uses as much as 4,077 gallons of fuel each flying hour and is one of the Air Force's most expensive aircraft to operate, the Air Force believes different training methods must be used to maintain B-52 crew combat readiness. SAC believes the combat readiness can be maintained by ground training in an advanced flight simulator, augmented flight training in a CTA, and effective use of available B-52 flight hours.

Ground training would make use of improved simulator technology, such as motion and visual capability, but it cannot totally replace in-flight training. SAC believes the ground weapon system trainer, currently being purchased, could reduce B-52 flying hours by as much as 20 percent. It is to provide simulator training for all six B-52 crew members.

#### CTA capabilities

CTA will be an off-the-shelf business jet or other production aircraft modified with appropriate avionics equipment to provide transferrable training for all B-52 crew members except the gunner. Gunner readiness will be maintained by an increase in ground-based trainer activity. CTA will provide training in 24 B-52 operations such as communications, air refueling rendezvous, decisionmaking, crew coordination, weapon delivery, navigation, and terrain avoidance. SAC anticipates use of CTA will further reduce B-52 flying hours by 25 percent. CTA is expected to use only about 6 percent of the fuel required for a B-52 and would cost considerably less to maintain. A 25-percent reduction in B-52 flying hours could save 88 million gallons of fuel and \$130 million each year. Depending on the price of fuel and the cost of CTA, Air Force officials believe the CTA program cost could be recovered in 3 to 7 years.

#### CTA acquisition efforts and plans

In June 1979 SAC identified the need for CTA to augment B-52 continuation training. The CTA concept was an outgrowth of an Air Force Air Training Command-operated Accelerated Copilot Enrichment program for SAC. The Accelerated Copilot Enrichment program is successfully providing younger SAC pilots with accelerated flying experience in a relatively low cost aircraft.

Two CTA studies were conducted in the first half of 1980. One evaluated the feasibility of a common airframe/engine program to satisfy the needs of four different aircraft, including the CTA and TTB trainers. The second study recommended CTA training configurations.

In July 1980 the Air Force issued a Request for Information to industry asking for planning data regarding the effect on CTA service life that would result from low level, high speed flight. In September 1980 the Air Force solicited comments from industry and Government agencies on a draft request for proposal for full-scale development. The Air Force plans to release the formal request for proposal in the spring of 1981. The Air Force anticipates award of the full-scale

development contract about August 1981. Under current budget considerations, the earliest projected production date is in 1983 with an initial operating capability in late 1984 or early 1985.

Acquisition of the CTA program is currently being planned in two phases: full-scale development and production. The Air Force plans to omit both the concept exploration and demonstration/validation phases because the CTA will be a low risk, off-the-shelf, commercial business jet. However, full-scale development will include testing to validate the CTA concept. When we completed our fieldwork in December 1980, the MENS for the CTA concept had not been approved and the program cost estimate had not been established.

Companion training may not be effective for B-52D aircraft crews

CTA training may not be as effective for B-52D aircraft crews since the CTA configuration will be similar to B-52G and B-52H aircraft which have avionics and electronic warfare equipment that is not the same as the B-52D. The Air Force plans to test the CTA concept viability using B-52G and B-52H crews but not B-52D crews.

In a concept of operations for CTA, SAC recognized the differences between the various B-52 aircraft models but stated only one CTA configuration should be purchased. SAC stated that because the B-52G and B-52H models represented 75 percent of the B-52 aircraft fleet, CTA should have equipment similar to the B-52G and B-52H. SAC has recognized that CTA training for B-52D crews may, therefore, not be as effective as for B-52G and B-52H crews.

A university study of CTA configurations completed in July 1980 concluded:

- Crew members other than pilot and copilot should experience high levels of skill maintenance from CTA practice because there is little difference between CTA tasks and B-52G and B-52H tasks.
- The advantages of CTA practice for pilot and copilot were not clear. CTA practice of general tasks that are common between aircraft should yield positive skill maintenance but practice of tasks peculiar to the individual aircraft may provide no skill maintenance and some negative transfer of training effects. If significant negative transfer of training occurs as a result of dual qualification in a B-52 and CTA,

safety of flight concerns may arise. Adequate training would reduce the negative transfer effects.

--Because the B-52 aircraft has different avionics and electronic warfare equipment, use of CTA to provide skill maintenance for B-52D aircraft crews was not recommended.

Since CTA is a new concept, the first part of the CTA development effort will be a year-long flight test program to evaluate the CTA operational feasibility and skill maintenance potential. The test program will be done in two phases using two aircraft. The first phase will be a 6-month test to determine concept viability using crews from a B-52G or B-52H squadron as a test group. Based on the test results, the B-52/CTA training mix will be adjusted to obtain the maximum transfer of training. The second test phase, lasting 6 months, will then be conducted to derive the best CTA training plan and to establish the required number of CTA aircraft.

Air Force officials recognize that careful consideration of safety factors is necessary since the pilot and copilot would be qualified in both the B-52 and the CTA. Accordingly, the Air Force plans to also evaluate the effects of dual qualification on pilot performance, including possible negative effects, during the first 6 months of the CTA testing.

#### CONCLUSION AND RECOMMENDATION

The four trainer aircraft programs are being justified because of deficiencies in the performance and projected quantities of current trainer aircraft, the potential for reducing fuel consumption and pilot training costs, and the potential for improving the effectiveness of pilot training. On the basis of our review of these programs, we believe the stated needs are valid and Air Force and Navy evaluation of alternative solutions is warranted.

We also believe the test program to evaluate the CTA concept is appropriate. However, since only crew members from a B-52G or B-52H squadron will be used as a test group, the results will only show whether CTA will provide positive skill maintenance for B-52G and B-52H crews. The test results may not be applicable to B-52D crews because of the differences in avionics and electronic warfare equipment. Accordingly, we recommend that the Secretary of Defense include B-52D crews in the CTA concept viability test program to obtain data on the applicability of the CTA to all crews.

## CHAPTER 4

### AIR FORCE AND NAVY PROGRAMS ARE

### GENERALLY COMPLYING WITH OMB

### CIRCULAR A-109

OMB Circular A-109 established policy to be followed by executive agencies in the acquisition of major systems. We reviewed the Air Force's NGT and the Navy's VTXTS acquisition programs and found that they are generally consistent with the intent of the circular, except that both services were too specific in identifying equipment characteristics in their request for proposals/quotations for concept exploration studies. Subsequent congressional direction regarding Air Force consideration of the Navy's T-34C for its primary trainer role negated, to a large extent, our concerns about the Air Force's NGT solicitation.

### OMB CIRCULAR AND DOD PROCEDURES ESTABLISH ACQUISITION POLICY

OMB Circular A-109, dated April 5, 1976, provides administrative direction to the heads of agencies in the acquisition of major systems. Each executive agency head is responsible for ensuring that the provisions of Circular A-109 are followed. In March 1980 DOD issued Directive 5000.1 which delegated responsibility for the management of system acquisition programs to DOD components such as the Air Force and Navy, except for decisions which A-109 requires of agency heads. DOD Instruction 5000.2 provides specific procedures for use by the services to implement pertinent OMB and DOD policy and describes the make-up and activities of DSARC. DSARC is a top-level DOD group that provides assistance and advice to the Secretary of Defense on system acquisitions.

The acquisition policy and framework established by A-109 or the implementing DOD procedures provide, in part, that

- top-level management shall be involved in determining agency mission needs and goals,
- communication with the Congress shall be early in the acquisition process,
- major system acquisitions shall be related to agency mission needs and goals,

--opportunities shall be provided for innovation by the private sector in designing new systems, and

--contractual competition shall be established early in the acquisition process and shall be continued as long as economically beneficial.

Following the determination of mission needs, the A-109 acquisition process is divided into (1) identification and exploration of alternative design concepts, (2) demonstration of alternative design concepts, (3) full-scale development and limited production, and (4) production.

Officials of OMB's Office of Federal Procurement Policy monitor agency implementation of Circular A-109. OMB officials view A-109 as calling for a flexible process, tailored to fit individual acquisition programs, rather than as a "cookbook" which must be rigidly followed.

#### AIR FORCE AND NAVY ACTIONS TO COMPLY WITH CIRCULAR A-109

The Air Force and Navy trainer aircraft acquisition programs represent efforts by both services to procure major systems in accordance with OMB Circular A-109. Both services have taken specific actions to acquire trainer aircraft according to OMB and DOD policies and procedures. Each service has designated a program manager within its respective air systems command, developed an acquisition strategy, solicited competition from the industry, and funded parallel concept exploration studies. In addition, the services have begun coordination regarding future trainer aircraft procurement. These actions generally comply with the intent of A-109. We found, however, that both services were too specific in their requests for proposals/quotations for concept exploration studies.

#### Requests for concept exploration proposals were too specific

Although the NGT MENS approved by the Deputy Secretary of Defense did not establish requirements for a twin-engine aircraft with side-by-side seating, the subsequent request for proposals for concept exploration studies limited aircraft configuration to twin engines and side-by-side seating. Similarly, the approved MENS for VTXTS did not contain specific requirements for an aircraft with a tandem seating configuration, but a constraint in the request for quotations for concept exploration proposals identified a need for tandem seating.

We believe these limitations in the Air Force's and Navy's request for proposals/quotations are not consistent with the intent of A-109. A-109 states that agencies should express needs and program objectives in mission terms and not equipment terms to encourage innovation and competition in creating, exploring, and developing alternative system design concepts. It also states that requests for alternative system design concept proposals will explain the mission need, schedule, cost, capability objectives, and operating constraints and that each offeror should be free to propose his technical approach; main design features; subsystems; and alternatives to schedule, cost, and capability goals.

The Air Force's February 15, 1980, request for proposals for NGT concept exploration studies stated, in part, that:

"\* \* \* Aircraft configuration shall be limited to twin engine and side-by-side seating. The offerors must be responsive to this requirement to be considered as a candidate."

The Navy's December 14, 1979, request for quotations for VTXTS conceptual studies included configuration and performance constraints which said that the aircraft should have "two seats, tandem." A constraint was defined as a boundary within which the system must fall except where adequate justification is presented, such as for greater overall cost effectiveness.

The restrictive language of the NGT request for proposals raised congressional and OMB questions about whether the Air Force allowed adequate consideration of the current Navy T-34C primary trainer aircraft as a suitable candidate for the NGT role. The congressional concern was that because the T-34C aircraft has a single engine and a tandem seating configuration, it was inappropriately precluded from entering competition for the NGT role. Air Force officials stated that sufficient consideration had been given to the use of the T-34C aircraft for their primary phase of flight training, but that the T-34C could not meet NGT performance and handling requirements. The Air Force addressed the use of the T-34C aircraft in the MENS by stating specific reasons why it was considered unsuitable for Air Force primary phase flight training. While the similar Navy restrictive language has not resulted in concerns about the elimination of alternative aircraft considerations, the potential exists for such a dispute.

The apparent elimination of the T-34C as a NGT candidate led to a request from the Chairman, House Committee on Armed



Services, for us to review the Air Force's NGT acquisition. Primary concerns related to whether (1) the T-34C could perform the Air Force's primary UPT mission, (2) the T-34C would have a lower life cycle cost than other alternatives for this mission, and (3) the Air Force is complying with OMB Circular A-109. Our report to the chairman was issued on February 9, 1981. In summary, we found that:

- The T-34C could be used as the Air Force's primary phase trainer. However, since the T-34C does not perform as well as the current primary trainer or as well as the Air Force's stated requirements for NGT, its use could result in either additional flying hours in the primary and basic phases or lower UPT standards with additional training hours in operational aircraft. Further, T-34C use could result in (1) the inability to reduce sortie losses caused by bad weather, (2) increased air congestion problems, and (3) greater use of auxiliary airports.
- The Air Force's life cycle cost comparison, which was prepared by a consultant, showed the T-34C was the least costly alternative if only the primary phase were considered, but the most costly if the total UPT program were considered. Some costs associated with the use of the T-34C aircraft were not included in the life cycle cost comparison. In addition, some of the estimated costs in the comparison were based on contractor proposals and could not be substantiated.
- The Air Force has generally complied with A-109, and its actions have resulted in significant competition--an important A-109 objective. Air Force requirements and actions, however, effectively eliminated the T-34C from consideration in the NGT program, and in our opinion, are not consistent with OMB Circular A-109. This inconsistency may be corrected because of congressional direction in August 1980 that the program be restructured to include consideration of the T-34C.

According to OMB officials, the determination of operational constraints is the responsibility of the programing organization and that Air Force requirements for an aircraft with twin-engine, side-by-side requirements would be appropriate if validated by the Secretary of Defense. OMB officials who have been monitoring the NGT acquisition program expressed concern that the NGT requirements were not contained in the NGT MENS. Neither the Air Force nor Navy requirements

in question were contained in the approved MENS and were not, therefore, validated by the Secretary of Defense.

Air Force officials acknowledge that the operational capabilities and constraints in question should have been enumerated in the NGT MENS. They said they plan to revise the MENS at the end of the concept exploration phase to include the requirements for a twin-engine, side-by-side trainer aircraft.

Congressional direction

In the August 1980 Conference Report, the Armed Services Committees requested that the Air Force restructure the NGT program to include among the various alternatives being considered, a full, open, and objective evaluation of the Navy T-34C primary trainer aircraft. As of January 1981, the Air Force was taking steps to comply with the congressional request. The congressional direction and the Air Force's consideration of the T-34C negate, to a large extent, our concern about the Air Force's NGT solicitation.

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